


NEGOTIATED MATCHING SYSTEM

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FIELD OF THE INVENTION

The present invention relates to a negotiated matching system that identifies potential counterparties to a transaction using criteria input by each user of the system and then enables communication between the counterparties so that the parties may negotiate the final terms and/or details of the transaction. The present invention further relates to a method of identifying potential counterparties to a transaction according to filtering criteria input by system users and then enabling communication between the counterparties so that they may negotiate the terms and/or details of the transaction.

BACKGROUND OF THE INVENTION

Automated dealing systems (e.g., for trading currencies, commodities, and the like) are increasingly replacing the conventional manner of dealing using a broker as an intermediary. When a broker is used to complete a transaction, anonymity of the counterparties is preserved either throughout the deal or until just prior to the completion of

be introduced to one another based on preliminary information input into the system, and then allowed to negotiate the terms of a transaction using a communication link.

Fourth, the known automated trading systems cannot accommodate credit-complex trading instruments. Credit-complex trading instruments are those for which the calculation of a trading party's risk or exposure at a given time is based on multiple elements and is therefore too complex to integrate into a large-scale trading system. Generally, in order to calculate its exposure, a bank must evaluate several types of risk, for example, credit risk, settlement risk, and liquidity risk. Credit risk is the effect of the transaction on the bank's overall books if the counterparty goes bankrupt before the transaction is completed. Credit risk is evaluated as the replacement value of the transaction assuming that the counterparty is unable to complete the transaction. Settlement risk is the risk that a bank will complete its half of the transaction and the counterparty will be unable to complete its half of the transaction, for example, because the counterparty goes bankrupt prior to settlement. Liquidity risk is the risk that the holder of an instrument will not be able to sell that instrument at a reasonable price when the holder wishes to liquidate the position.

The determination of credit risk is fairly straightforward for short-term transactions such as spot transactions which are settled as soon as the market allows because the risk that a counterparty will go bankrupt during the short period of time prior to settlement is very small. Therefore, it is likely that both parties will complete the settlement of the transaction.

However, the complexity of calculating credit risk increases significantly as the settlement period increases. For example, in forward markets, e.g., the forward foreign exchange and forward rate agreements markets, often transactions do not have a final settlement for several months, a year, or longer. Clearly, there is a greater risk that a counterparty will go bankrupt within this longer period of time prior to settlement. As a

result, banks' methods of calculating their long term exposure, including both settlement and credit risk, become increasingly complex and take into account multiple factors.

Therefore, banks and other financial institutions use complex formulae and methods to calculate their potential exposure for each transaction based on a highly complex evaluation of the time decay of the value of money and risk, the institution's total exposure, and numerous other factors. Each financial institution has its own systems and procedures for evaluating its exposure. These credit and risk management procedures are highly confidential and not standardized by any means. As a result, to successfully accommodate these procedures into a single automated trading system, either the financial institutions must standardize their procedures or the implementers of the system must customize their system to accommodate each different institution. Neither of these options is a practicable solution to this problem because banks are not likely to standardize their credit and risk management processes and a customized trading system would be economically infeasible. Also, banks and other trading institutions are extremely protective of information regarding their credit and risk management procedures and may be unwilling to give out this information to third-party programmers who are designing a system or to put this information on line where other parties may be able to access it.

SUMMARY OF THE PRESENT INVENTION

In view of the above described problems associated with known automated trading systems, it is an object of the present invention to provide a negotiated matching system which introduces potential counterparties to a transaction based on a first, firm set of transaction parameters input into the system by each party, and then enables communication between the potential counterparties to negotiate a second, negotiated set of transaction parameters. A transaction is only completed when both sets of transaction parameters are

agreed upon by all parties to the transaction. The sets of transaction parameters may vary for each market. Also, in some markets, traders may negotiate all transaction parameters.

A further object of the present invention is to provide a system which enables users to trade financial and other types of instruments based on objective criteria and subjective criteria which are not standardized and/or easily quantifiable.

It is a further objective of the present invention to provide a negotiated trading system which enables users to enter expressions of interest with respect to a type of transaction, wherein the user need not provide defined or objective criteria necessary to complete the transaction.

It is another objective of the present invention to provide a negotiated trading system which identifies parties who are potentially interested in transacting business and place these parties in communication with one another.

It is another object of the present invention to provide a negotiated trading system which accommodates the numerous complex and non-standardized exposure evaluation procedures of various financial institutions within a single automated trading system while preserving the confidentiality of these procedures.

Yet another object of the present invention is to provide a matching system which automatically matches users making offers (offerors) or bids (bidders) with potential counterparties who are interested in the type of offer/bid being made by the offeror/bidder, wherein the parties are mutually acceptable trading partners for the particular category of transaction sought by the offeror, and wherein the identity of the parties to the transaction is not revealed until just before or at the time a deal has been struck.

The aforementioned objects, as well as other objects, of the present invention are achieved by providing a negotiated matching system with a filtering feature that filters the

potential transactions to be displayed to a trader based on ranking and other transaction information input by the trader and potential counterparties. The ranking information provides an indication of how each user ranks other users in terms of acceptability as a counterparty to one or more types of transactions. Thus, counterparties who do not each achieve a minimum predetermined ranking score set by the other are filtered out. As a result, potential transactions between unacceptable counterparties are not displayed to the user, and unacceptable trading counterparties are not matched by the system. The other transaction information includes trading parameters, such as price and quantity of an instrument to be traded.

The negotiated matching system according to the present invention includes a plurality of remote terminals associated with respective potential counterparties and a communications network for permitting communication between the remote terminals and a matching computer and between the remote terminals themselves. Each user enters a first set of transaction parameters including ranking and other information into his or her remote terminal. The matching computer uses the first set of transaction parameters (ranking data, price data, size data and other parameters or attributes) from each user to identify potential transactions with potential counterparties. If potential transactions are identified, the respective parties are notified so that they may begin negotiation of a second set of transaction parameters. The second set of transaction parameters which may be negotiated by the parties to the potential transaction identified by the system may consist of 1) some or all of the parameters in the first set of transaction parameters, 2) some parameters from the first set and other parameters not included in the first set, or 3) only parameters not included in the first set. Both the first and second set of transaction parameters must match before the system will execute a transaction.

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provides a framework for matching potential counterparties without necessarily automatically executing transactions. The discretion to execute a transaction thus may remain with the traders themselves and is not surrendered to the system.

One embodiment of the negotiated matching system according to the present invention includes a matching computer; a plurality of remote terminals corresponding to a plurality of users, wherein the remote terminals enable the users to enter transaction data into the system; and a communications network for transmitting negotiating messages between two or more of the remote terminals in response to control signals from the matching computer. The matching computer is coupled to the plurality of remote terminals by the communications network. The matching computer matches potential counterparties to a transaction based on the transaction data entered by the users and generates the control signals when a potential match is identified.

A second embodiment of the present invention includes a matching computer; a plurality of remote terminals corresponding to a plurality of users, wherein the remote terminals enable the users to enter transaction data and ranking data into the system; and a communications network for transmitting negotiating messages between two or more of the remote terminals in response to control signals from the matching computer. The matching computer is coupled to the plurality of remote terminals by the communications network. The matching computer matches potential counterparties to a transaction by comparing the transaction data entered by the users and filtering the transaction data using the ranking data. The matching computer generates the control signals when a potential match is identified.

A method of identifying potential counterparties to a transaction according to the present invention includes the steps of receiving ranking data and transaction data from a plurality of remote terminals corresponding to a plurality of potential counterparties to a type

of transaction; filtering the transaction data using the ranking data to identify for each user transactions with potential counterparties who are mutually acceptable based on the ranking data, thereby matching potential counterparties to a transaction; and transmitting negotiating messages between the potential counterparties, thereby enabling the potential counterparties to negotiate terms of the transaction.

Various additional advantages and features of novelty which characterize the invention are further pointed out in the claims that follow. However, for a better understanding of the invention and its advantages, reference should be made to the accompanying drawings and descriptive matter which illustrate and describe preferred embodiments of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 provides a diagram of one configuration of the negotiated matching system according to the present invention.

FIG. 2 provides a flow chart of the operation of the negotiated matching system according to the present invention.

FIGS. ^{3, 4, 4A, 5A, 5B, 6, and 7}~~1-7~~ provide illustrations of sample screens displayed on the remote terminal displays of two parties to a transaction at different stages of the transaction.

DETAILED DESCRIPTION

The negotiated matching system according to the present invention will now be described with reference to the accompanying drawings.

With reference to FIG. 1, one possible configuration of the negotiated matching system 100 according to the present invention includes a matching computer 11 and remote terminals 101 and 102. The system contemplates a plurality of remote terminals whereby a large number of users have simultaneous access to the negotiated matching system; however, for description purposes, two remote terminals 101 and 102 and optional remote

terminals 103 and 104 are shown in FIG. 1.

The matching computer 11 is connected to the remote terminals 101 and 102 through a communication network 1. Nodes 17 and 19 may also be inserted into the communication network 1 between matching computer 11 and remote terminals 101 and 102. These nodes 17 and 19 may be intelligent nodes which, for example, perform filtering operations or passive nodes (repeater stations) which merely transmit information from the matching computer 11 to the remote terminals 101 and 102. Connectors 21 and 23 maybe used to connect additional remote terminals (e.g., 103 and 104) and/or additional nodes (e.g., 25 and 27) to the network.

Remote terminals 101 and 102 also are connected via communication network 1. Remote terminals 101 and 102 may communicate with each other via network 1 once the filtering and matching process is completed by the matching computer 11. This operation will be described in further detail below with reference to FIGS. ^{3, 4, 4A, 5A, 5B, and 6}~~3-6~~.

The communication network 1 may also include switching centers (not shown) which are configured as a conventional packet switching network so that, if the most direct route between remote terminals 101 and 102 becomes inoperable due to a malfunction in a part of the system, the routing can be varied to enable communication between the terminals 101 and 102. It will be appreciated that, in many situations, terminals 101 and 102 will be distributed around the globe.

The negotiated matching system according to the present invention may be realized using a number of different network configurations. For example, where nodes 17 and 19 are passive (repeaters), matching computer 11 performs all matching and filter operations for the system as will be described below. Where nodes 17 and 19 are intelligent nodes, these nodes may perform some filtering functions, while matching and additional filtering takes

place in the matching computer 11. Filtering may also be performed by remote terminals 101 and 102. Particularly in a worldwide system, the use of intelligent nodes will prevent overloading of the computer or network and result in more efficient operation of the negotiated matching system.

FIG. 2. provides a flow chart which illustrates the overall operation of the negotiated matching system according to the present invention shown in FIG. 1 (with intelligent nodes such as 17 and 19). The functions of the matching computer 11 as described below may be performed using a configuration of hardware components, software components, or both. The system may accommodate a plurality of markets (e.g., foreign exchange, interest rate swaps, etc.). However, for purposes of simplicity, the operation of the system in a single market will be described below. The steps of operation are as follows.

INITIAL OPERATION

- 201 - Each user enters ranking information (as described below with reference to FIG. 1).
- 202 - ranking information from each user is uploaded to the matching computer 11 and stored.
- 203 - the ranking information is then distributed by the matching computer 11 to intelligent nodes 17, 19, etc. where it is stored (this step is optional depending on the configuration of the system - if there are no intelligent nodes, storage occurs only in the matching computer 11).
- 204 - the users enters bids and offers including firm (non-negotiable) and soft (negotiable) parameters pertaining to the bids and offers (e.g., price, quantity, expiration terms, acceptable credit

ranking) into the system using their remote terminals. Traders may enter bids and offers into the system at any time.

- 205 - the matching computer 11 uploads and stores entered bids/offers with their corresponding parameters.

MATCHING OPERATION

- 206 - the matching computer attempts to match bids and offers entered by the users based on the parameters of the entered bids and offers and the ranking information entered by the users. The bids and offers entered by the users may also be matched with standing orders or resting orders already in the system.
- 220 - if a match between a bid and an offer is identified, the matching computer 11 then freezes (places on hold) the bid and offer so that it is not displayed to other users (in a different embodiment of the system, the offer or bid is not held such that other users may select it simultaneously and attempt to negotiate a better deal with the offeror or bidder).
- 221 - once the offer and bid are frozen, the system automatically signals counterparties to enable electronic communication between the two parties to the potential transaction.
- 222 - once the traders have agreed to the transaction (e.g., each party has performed its credit and risk management procedures in which any objective and/or subjective criteria may be evaluated and is able to complete the transaction) and an agreement has

been reached as to all firm and soft parameters of the transaction, the remote terminals of the offeror and bidder send signals to the matching computer 11 to execute the transaction and remove the offer and bid from the system.

- 223 - (optional) trade tickets are printed for each party to confirm the transaction.
- 224 - the transaction is recorded by the matching computer 11, and (optional) the price and quantity of the transaction is broadcast to the remote terminals of all traders on the system.
- 225 - if the traders are not successful in negotiating a deal, the offeror or bidder may have the option of re-entering the offer or bid into the system.
- 207 - if no matches are identified, the bids and offers are distributed to the users of the system as described below in step 208.

DISPLAY OPERATION

- 208 - either simultaneously with, before, or after trying to match the entered bids and offers described above in step 206 (depending on the desired implementation of the system), the matching computer 11 distributes the bids/offers to the intelligent nodes 17, 19, etc. where they are optionally stored.
- 209 - each user selects a display mode (no filtering, unilateral filtering, or bilateral filtering or a combination of these).
- 210 - if the bilateral display mode is selected, the node corresponding to the user's remote terminal or the remote terminal itself

filters all offers and bids in the market using the ranking information from each user to determine whether parties are acceptable to one another. The remote terminal then displays all offers/bids in the market which are mutually acceptable to the user and a potential counterparty.

- 211 - if the unilateral filtering display mode is selected, the user may select whether filtering is performed using the user's ranking information or potential counterparties' ranking information.
- 212 - once the user has made this selection, the node corresponding to the user's remote terminal or the remote terminal itself filters the offers and bids in the market based on ranking information as requested by the user and displays all acceptable offers/bids in the market.
- 213 - if the "no filtering" display mode is selected, the node corresponding to the user's remote terminal transmits for display all offers/bids in the market.
- 214 - once the filtered or unfiltered bids/offers are displayed, the user may "hit" or "take" one of the displayed bids or offers.
- 215 - the hit and take messages are uploaded to the matching computer 11.
- 216 - if the taken offer or hit bid is available to the trader based on the ranking information and the bid/offer parameters entered by both the trader and the potential counterparty, the matching computer 11 freezes the offer or bid so that it is not displayed

to other users as described in step 220 above, and the steps following step 220 are performed as described above.

217 - if the transaction is not available to the user, for example, based on the ranking information entered by both the user and the potential counterparty or the timing of the hit or take, the user is informed that the transaction is not available.

Unlike bids and offers entered into the system in step 204, when a party hits a bid or takes an offer in step 214, the party in effect enters an offer with terms corresponding to the hit bid or a bid with terms corresponding to the taken offer. If the matching process does not result in a potential transaction, the hit or take is removed from the system without any effect on the standing order book.

As described above, each trader may personalize his or her display screen based on the information the trader desires to see. For example, for each instrument, the trader may view all bids and offers available in the market (no filtering); only the offers and bids from counterparties ranked above a certain ranking entered by the trader (unilateral filtering); only the offers and bids available to the trader based on other parties' ranking of the trader (unilateral filtering); only bids and offers that are mutually acceptable (bilateral filtering); or a combination of several options. According to one embodiment of the negotiated matching system according to the present invention, each trader screen is arranged to display all offers and bids available in the market (no filtering) in one window of the display screen and the bids and offers available to the trader based on mutual acceptability (bilateral filtering) in another window on the display screen (see FIG. 4).. However, other arrangements are contemplated within the scope of the present invention. As a result, a trader may obtain a personalized view of the market. The filtering necessary to provide the selected personalized

view of the market may be performed by remote terminals 101 and 102, intelligent nodes such as 17 and 19, or the matching computer 11.

With reference to FIGS. 3, 4, 4A, 5A, 5B, and 6, the step-by step operation of a negotiated matching system according to the present invention will now be described in detail.

With reference to FIG. 3, prior to or during commencement of trading activities, each party enters ranking information indicating the party's willingness to trade with other parties (i.e., counterparties) in the system, for example, using a display screen 300. The ranking information may take the form of a banding scheme, for example, using a system of letters to represent each band of counterparties listed in column 301 as shown in column 302. The ranking scheme may be based on specific values such as monetary value that parties are willing to lend to and borrow from others or less tangible forms of evaluation such as general relations between companies, the country of origin, or any type of objective or subjective criteria as desired by the ranking party. An objective ranking scheme may be as follows:

<u>RANKING</u>	<u>VALUE (size of counterparty)</u>
A	very large (assets > \$1B)
B	large (assets > \$500M)
C	medium/large (assets > \$250M)
D	medium (assets > \$100M)
E	medium small (assets > \$50M)
F	small (assets < \$50M)

Similarly, a subjective ranking scheme may be as follows:

<u>RANKING</u>	<u>VALUE</u>
A	preferred business associates
B	businesses with good reputation

C

businesses with average reputations

D

businesses with poor reputations

The ranking information entered by each user of the system may differ for each type of instrument (each market). For example, each user may enter different ranking information for different markets such as forward foreign exchange trading, lending, forward rate agreements, interest rate swaps, etc. The user may also enter different ranking information within each market depending on the direction of the currency flow. For example, a user's rank of a counterparty for lending purposes may be different from the rank for borrowing purposes. Furthermore, the ranking scheme for each type of transaction may be based on different criteria as desired by the individual user. The only constant is the symbols indicating the ranking bands or categories (e.g., A, B, C, D, E, F, etc.). These categories may have different values for each user in each market.

There may also be a series of ranks by which counterparties may be filtered multiple times based on different criteria. For example, a first filtering process may be based on size of counterparties, and a second filtering process may be based on the assets of the counterparties.

For example, using the objective or subjective ranking scheme provided above, Bank 1 might enter the following ranking information:

<u>COUNTERPARTY</u>	<u>RANKING</u>
Bank 2	C (medium/large)
Bank 3	A (very large)
Bank 4	D (medium)

Similarly, Bank 2 might enter the following ranking information:

<u>COUNTERPARTY</u>	<u>RANKING</u>
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Bank 1 B (good reputation)
Bank 3 A (preferred business associate)
Bank 4 C (average reputation)

Other ranking schemes such as numeric ranks and yes/no ranks may also be used.

Users may change their rankings of other counterparties at any time. If a user enters new ranking information, the system will update its information as well as optionally update the information displayed on all counterparties' displays to dynamically reflect the new ranking. Therefore, the information stored in the matching computer 11 and displayed on the counterparties' display screens is automatically updated as rankings are modified by the users.

The ranking information from both banks is uploaded to matching computer 11 and stored there, for example, in a random access memory device. In another configuration of the system according to the present invention, the ranking information is uploaded into matching computer 11 from the remote terminals 101 and 102, stored, and then distributed by the matching computer 11 to intelligent nodes (such as 17 and 19 shown in FIG. 1) which perform filtering operations to provide each user with a personalized view of the market. Thus, the location of the filtering processes within the network may be varied according to the desires of the user and implementer of the system. However, the matching and at least some filtering operations are preferably performed in the same location, for example, in matching computer 11.

The user then selects which market he or she wishes to view, for example using a choice box as illustrated in FIG. 7 selected from the "Display" menu of screen 400 (see FIG. 4).

Once a market is selected, each trader views a market screen such as the forward rate

last trade as well as the amount of the last trade.

Notably, the trader may access the credit limit entry screen shown in FIG. 3 and change counterparty rankings at any time by selecting the screen from a menu such as the "Admin" menu shown at the top of screen 400.

Other information such as help information or financial news may also be displayed on screen 400, for example, in box 412.

The trader may enter bids, offers, hit and takes into the system, for example, using entry screens shown in FIGS. 5A and 5B. As shown in bid box 500 in FIG. 5A, the trader may, for example, enter a bid to buy a quantity of 10 (box 502) at a price of 5.69 (box 501). The trader may set the duration of the offer in box 503 and the minimum ticket size in box 504. A trader may enter an offer to sell using a similar order entry box (not shown). The trader also inputs a ranking limit with its bid in box 505 such that it is only willing to be matched with offers from counterparties which it ranks the same as or higher than the input rank limitation if bilateral filtering is implemented. The entered ranking limit also ensures that the bid will only be displayed to those potential counterparties whom the trader ranks equal to or greater than the entered ranking limit. For example, if the trader inputs a ranking limit of C in box 505, its bid will only be displayed to potential counterparties that the trader ranks as an C or higher. A ranking of A is displayed in box 505, indicating that the bid will only be displayed to counterparties ranked as an A by the bidder.

Similarly, in the "Yours" (hit) box of FIG. 5B, the trader enters a quantity in box 508 and a ranking in box 507. The price shown in box 506 indicates the bid price that the trader wishes to hit.

Based on the price, quantity, and ranking information entered into the system by the trader, the system attempts to locate a match for the trader's order (bid or offer). The match

